Watershed: Sacramento River – Auburn Ravine

**Years Sampled: 2010-2012**

Study Objectives:

1. Is there any evidence that beneficial uses are being impacted, and if so, what are potential contributors?
2. Are there any noticeable regional, seasonal or trends observed in the water quality data?
3. What are pathogen concentrations at selected monitoring sites?

KEY STATISTICS

Number of sites sampled	**3**
Sampled by	**Water Board Staff (Sac)**
Number of sites sampled for pathogens	**2**
Number of total samples	**68**
Sampling Frequency	**2x/mo. (May-Sept.)**
Assessment Threshold	**320 MPN/100 mL**

MESSAGE: **All three sites have had at least five samples with elevated *E.coli* and two sites have tested positive for pathogens.**

Site Locations:
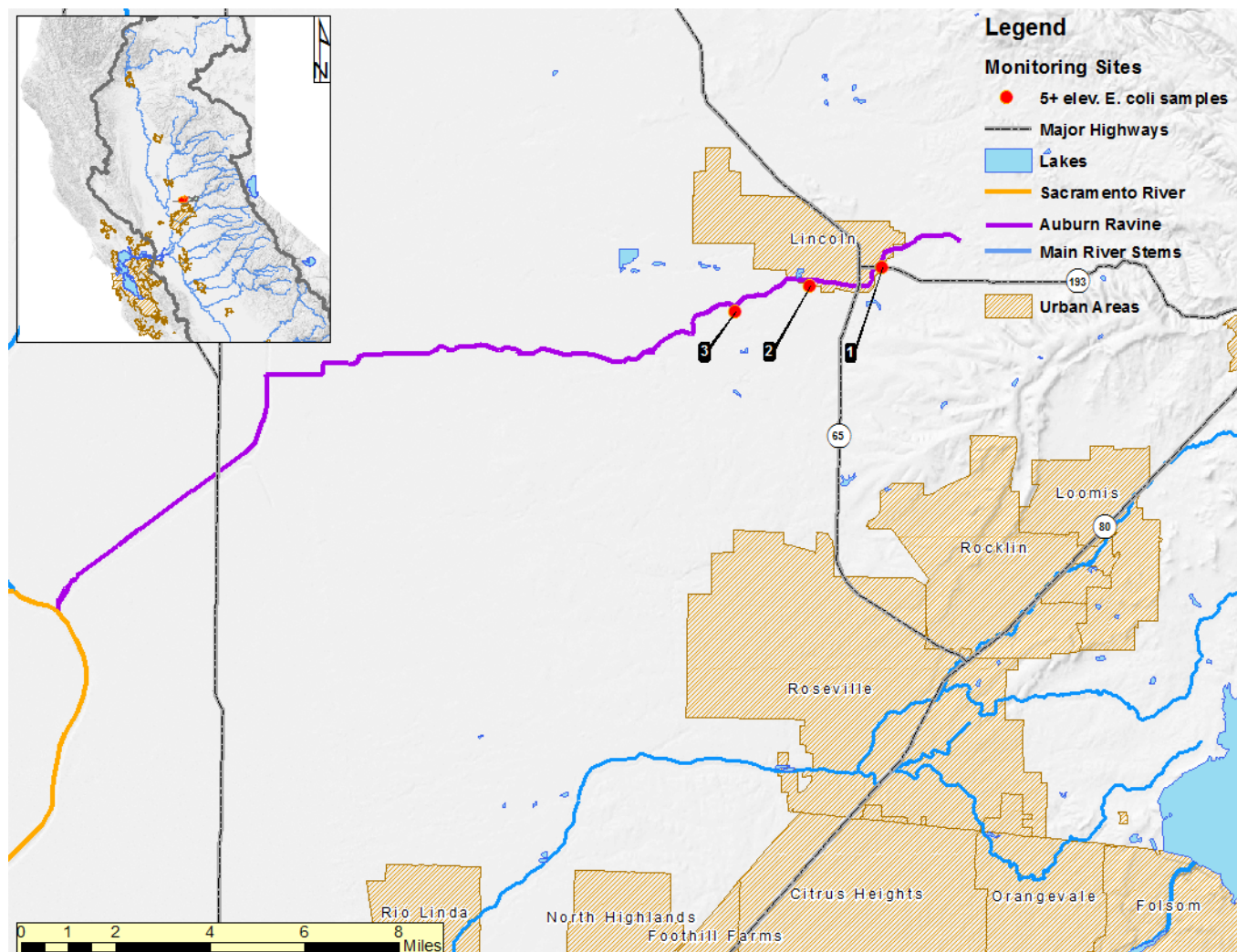
Summary of Results:

Table 1: Field Measurements

Station Code	Map #	Station Name	Oxygen, Dissolved (mg/L) Min	Max	pH Min	Max	SpConductivity (uS/cm) Min	Max	Temperatiure (°C) Min	Max	Turbidity (NTU) Min	Max
519PLA930	1	AR at HWY-193 Bridge	8.45	13.00	6.89	8.16	59.0	287.0	13.17	20.19	1.35	298.00
519PLA931	2	AR at Joiner Parkway/1st Street	8.14	13.35	7.15	8.49	44.0	292.0	13.74	20.60	2.33	251.00
519PLA932	3	AR at Nelson	8.07	12.22	6.94	7.67	66.0	290.0	14.67	20.92	1.88	249.00
AR: Auburn Ravine, NR: Not Recorded												

Table 2: *E. coli* and Pathogen Results

Map #	*E. coli* (MPN/100ml) Mean	Min	Max	Count	>320	*Cryptosporidium* (cysts/L) Max Result	Count	(+)	*Giardia* (oocysts/L) Max Result	Count	(+)	*Salmonella* (MPN/100mL) Max Result	Count	(+)	*E.Coli* O157:H7 (Presence/Absence) Result	Count	(+)
1	312.0	50.4	2419.6	22	5	NA	0	0	NA	0	0	NA	0	0	NA	0	0
2	379.0	53.8	2419.6	23	5	0.1	2	1	0.8	2	2	Not Detected	1	0	Not Detected	1	0
3	961.3	88.4	2419.6	13	8	Not Detected	1	0	0.8	1	1	Not Detected	1	0	Not Detected	1	0

E.coli - Highlighted Cells: Exceeds EPA Guidline of 320 MPN/100ml   Pathogens- (+): positive result, Highlighted Cells: positive results, NA: Not Applicable

Graph 1: *E Coli* Results
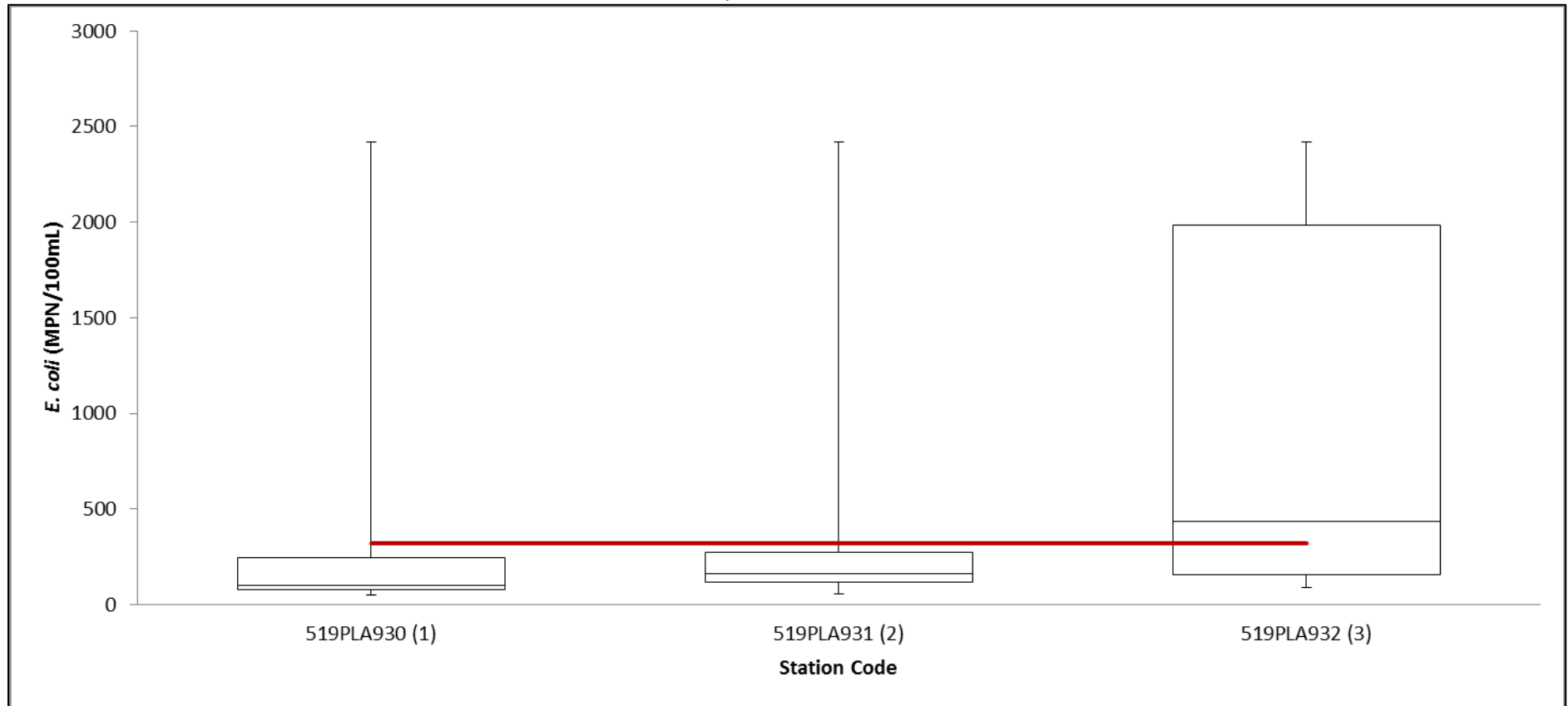
1,2,3 = progressive DS flow along Auburn Ravine

WHAT IS THE MEASURE SHOWING?

The sites located in the Auburn Ravine sub-watershed are in the southernmost area of the City of Lincoln. Auburn Ravine flows west from the foothills of Auburn into the Sacramento River via the East Side Canal in Sutter County. Field measurements for each site are shown in Table 1.

Results show that all three sites exhibited elevated levels of *E. coli* in Auburn Ravine on one or more occasions (shown in Table 2). There were 18 samples with elevated levels out of 58 samples; the percentage of contamination at the above sample locations is 31.0%. The highest concentration (>2419.6MPN/100 mL) occurred at all three sites. Sites at Joiner Parkway/1st Street (2) and Nelson (3) also have averages above the recommended EPA guideline (320 MPN/100mL).

The watershed is primarily herbaceous (Jin et al., 2013), yet potential non-point and urban sources are abundant. Further study is needed to identify specific sources.

Two sites in the Auburn Ravine sub-watershed were sampled for pathogenic *E. coli* O157:H7, *Cryptosporidium*, *Giardia*, and *Salmonella*. Both of the sites tested positive for pathogens (shown in Table 2). There are currently no water quality objectives for these constituents.

WHY THIS INFORMATION IS IMPORTANT?

In 2012, the USEPA amended recreational water quality guidelines for human health under the Clean Water Act, specifying the standard threshold value (STV) for the indicator bacteria *E. coli* as 320 colony-forming units (CFU) per 100 milliliters (mL). The STV represents the 90% percentile of the water quality distribution, beyond which the water body is not recommended for recreation (Nappier & Tracy, 2012).

E. coli is an indicator of potential fecal contamination and risk of illness for those exposed to water (e.g. when swimming).   Since *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern, the data collected from this study provide more information on pathogen indicators as well as specific water-borne pathogen concentrations to better assess their impact on the beneficial use of recreation and to identify potential contributors by sub watershed.

WHAT FACTORS INFLUENCE THE MEASURE?

E. coli and specific water-borne pathogens can come from human or animal waste and may be highly mobile and variable in flowing streams. In addition to human recreational use, the presence of pathogens in water may be the result of cattle grazing, wildlife, urban and agricultural runoff, or sewage spills. The physical condition of the watershed may also influence pathogen measurements, however in this study field measurements (temperature, SC, DO, turbidity and pH) were variable between sites and it is unclear if these constituents had an effect on the *E. coli* or pathogen measurements.

TECHNICAL CONSIDERATIONS:

- Data available at: CEDEN
- *E. coli* is only an indicator of potential pathogens and does not necessarily identify an immediate health concern.
- Public reports and fact sheets are available at:
  http://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_studies/surface_water_ambient_monitoring/swamp_regionwide_activities/index.shtml

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http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/upload/factsheet2012.pdf